

# Electronics Factory Uses RFID to Manage Assembly of Cisco Circuit Boards

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**The system, which has improved production efficiency, is the result of a combined effort between Cisco Systems and Jabil, the company that assembles its products.**

By Claire Swedberg

May 25, 2012—Electronics manufacturer [Jabil](#) has been applying radio frequency identification tags to some of the printed circuit boards assemblies (PCBAs) that it manufactures for [Cisco Systems](#). As a result, according to B.J. Favaro, Cisco Systems' supply chain manager, and Bill Hajje, Jabil's global process manager, the firm has improved the efficiency of its production process by approximately 80 percent, benefitting both companies.

In 2008, a Cisco hardware engineer collaborated with Jabil to employ RFID in a circuit-board design to store data about the host board. At that time, Jabil began placing EPC Gen 2 passive ultrahigh-frequency (UHF) RFID tags containing 512 bits of user memory on each of a select line of circuit boards. The purpose, the companies report, was to replace paper and pen for recording data, such as a product's board ID, release version and test results, during the design stage. Jabil attached a [Murata MagicStrap RFID tag](#) (designed specifically for mounting on PCBs) to a copper-free zone near the circuit board's edge, and coupled it to the board's ground plane. An outside vendor provided software and systems-integration services for the RFID deployment.



Jabil's Bill Hajje

Last year, Jabil proposed using the RFID tags for purposes beyond storing board data. It suggested that the tags could be utilized for work-in-progress (WIP) to quickly and transparently identify boards as they pass through the various manufacturing steps. Jabil can then share this information with Cisco. In addition, the solution could be utilized for authentication purposes, in order to verify that a PCB was, in fact, manufactured by Jabil for Cisco. Initially, Favaro says, Cisco is opting to use the technology only for WIP applications. Authentication with RFID tags is not part of Cisco's immediate plans, he explains, since the company already has an effective authentication program in place.

Jabil proceeded to install [Alien Technology ALR-9650](#) and [ALR-9900](#) RFID readers at 14 locations within its main production facility in Shanghai, including at pack-out locations, where the PCBs are readied for shipment to Cisco. When circuit-board assembly begins, the MagicStrap tag is placed on the board along with other components, and the tag identification number (TID) is read and entered into the database. The circuit board's serial number and assembly number are then linked with that tag ID. During the assembly process, the board passes through a series of workstations. At each station, an Alien fixed interrogator captures that ID number and forwards it, along with the station's location identifier and a timestamp, to the back-end software, thereby creating a record of that PCB's arrival.

Circuit boards, when tested, are placed within a chamber in which [ATID AT870](#) handheld readers are

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used to capture the unique ID number. In this case, Hajje explains, a fixed interrogator would not fit into the small space in which the circuit-board testing occurs.

Once assembled and ready for shipment to Cisco, the circuit board passes through a pack-out station, where the board's serial and assembly ID numbers, as well as a Cisco header, are written to the tag via a [Sirit Infinity 510 interrogator](#), and the information is then locked onto the tag, with a password required in order to access or change that data.

By collecting and viewing the location data for every circuit board as a work in progress, Favaro says, Jabil reports that it has successfully improved efficiencies, by identifying areas that may create bottlenecks at the assembly stations, or locations at which the boards spend excessive amounts of idle time. By making its own operations more efficient, and by reducing the cost and time spent manufacturing its products, he adds, Jabil can pass the savings on to Cisco.

At present, Favaro notes, the solution is installed on only a single assembly line, at which one specific circuit board is destined for servers used within data centers. According to Hajje, Jabil plans to provide RFID readers on other assembly lines for some additional PCBs used in Cisco products, though a timeline for that expansion has yet to be determined.

By RFID-enabling the assembly line, Hajje says, Jabil has improved its efficiency by approximately 80 percent—not only by helping management identify bottlenecks, but also by eliminating the need for operators to manually scan a bar code during the assembly process, as had previously been the procedure at that station. The company plans to continue doing this for other products and assembly lines as well, he says, noting that Jabil is currently in discussion with at least one other customer that might be interested in employing the RFID solution for the assembly of its own electronic products.

Once placed into a chassis as part of the assembly process, the printed circuit board can no longer be read. Nonetheless, Favaro notes, if a product is returned and the PCB is accessed for repair, Cisco could again read the board's RFID chip, thereby providing information about that board's identity and manufacturing date. However, the firm is not yet utilizing the system for this purpose.

While in use at Jabil, Hajje says, the tag has a read range of several meters. He says he tested the read range by placing a stack of circuit boards on a cart and pulling them away from the interrogator until the reads failed.

Since the system's implementation—which was funded jointly by Jabil and Cisco—Jabil has been providing reports to Cisco regarding the WIP process for its products.